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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/528,822

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EXAMINER

CLARK, MAYA ANGELICA

ART UNIT

PAPER NUMBER

3742

MAIL DATE

DELIVERY MODE

02/22/2010

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/528,822	Applicant(s) CROUSE ET AL.	
	Examiner MAYA CLARK	Art Unit 3742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 October 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 29,32-39,43,46-50,52 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 29,32-39,43,46-50 and 52 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10/14/2009 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input checked="" type="checkbox"/> Other: <u>See Continuation Sheet</u> . |

Continuation of Attachment(s) 6). Other: JP62-181898; JP63-157778, Cement and Concrete Basics

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Regarding claim 43, I changed it to 10E7 watt per cubic centimeter and 10E18. I used a short cut for 100000000 watt per cubic centimeter etc.

DETAILED ACTION

Response to Amendment

1. The amendment filed on 10/14/2010 has been entered. Claims 30, 31, 40-42, 44, 45, and 51 have been cancelled. Claim 29 has been amended. Claim 52 is new. Claims 29, 32-39, 43, 46-50, and 52 are now pending. The previous specification objections are withdrawn in light of the applicant(s) arguments.

Drawings

2. The drawings were received on 10/14/2009. These drawings are acceptable.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 29, 34-36, 47-49, and 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuwahara (JP 62-181898), Hamasaki (US 4568814), Rizioiu (US 6231567 B1), Sugita (JP 63-57778), and Fujita (US 4263495).

Regarding claims 29 and 47, Kuwahara et al (hereinafter Kuwahara) discloses a method for cutting cement-based materials. This method consists of mutually traversing a surface to be cut with a laser beam sufficient to produce a desired depth of molten material (Kuwahara- paragraphs 1-2 on page 2; paragraphs 2-4 on page 4; paragraphs

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1-2 and 5 on page 8). Kuwahara also discloses the removal of cement based particles by suction means (Kuwahara-paragraph 5 on page 8).

Secondly, Kuwahara discloses a detector for detecting the depth of molten material, and after the desired depth is reached, a new laser cutting pass starts (Kuwahara- paragraph 2 on page 8). Kuwahara fails to disclose a method wherein the laser cut produces a depth of molten material having a maximum depth of 10 mm at each traverse.

Hamasaki et al (hereinafter Hamasaki) discloses a method for dismantling of a biological shield wall of made up of concrete i.e. a cement based material in a nuclear reactor having a thickness of 1 to 1.5 meters (Hamasaki-col.3, line 41-43). Hamasaki also talks about the laser cutting of plain concrete layers having a thickness of 100 millimeters (Hamasaki-col.1, lines 56-60). The Hamasaki method serves as an effective way to easily and safely cut concrete (Hamasaki-col.2, lines 8-11). Since Hamasaki can cut through concrete with a thickness of 1.5 meters. It would have been obvious to one of ordinary skill in the art at the time the invention was made to conclude that the Hamasaki reference can cut through a cement based material thereby producing a 10 millimeters depth of molten material.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate Hamasaki's concrete cutting depth ability into Kuwahara's method in order to cut and produce the desired molten depth.

Additionally, Kuwahara fails to disclose that the laser beam is unfocused.

Rizoiu et al (hereinafter Rizoiu) discloses a method capable of generating a laser beam that is unfocused (Rizoiu-col.10, line 3). An unfocused laser beam would produce the required small depth of cement based molten material.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the unfocused laser beam of Rizoiu's method into Kuwahara's method because the unfocused laser beam would produce the required small depth of cement based molten material.

Lastly, Kuwahara fails to disclose that the molten material is resolidified and then broken into particles.

Sugita et al (hereinafter Sugita) discloses a device wherein the means for breaking resolidified material comprises a percussive member for crushing the material (Sugita-lines 31-33 on page 3).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the resolidification and breaking means of Sugita's device into Kuwahara's method to further crush and remove the cement based material.

Additionally, Kuwahara fails to disclose a laser beam power density.

Fujita et al (hereinafter Fujita) discloses a laser beam device with a laser power density.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the laser power density option of Fujita's

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into Kuwahara's method to more adequately control the laser cut thereby producing the desired molten depth.

Regarding claim 34, Kuwahara in view of Hamasaki, Rizioiu, Sugita, and Fujita discloses a method wherein the material is removed directly after solidification after each pass (Kuwahara- paragraphs 4-5 on page 8).

Regarding claim 35, Kuwahara in view of Hamasaki, Rizioiu, Sugita, and Fujita discloses a laser cutting method characterized in that the method uses a hollow tubular like fragmentation agent capable of breaking up the resolidified cement based material (Sugita-lines 31-33 on page 3 and figure 1-label 9).

Regarding claim 36, Kuwahara in view of Hamasaki, Rizioiu, Sugita, and Fujita fails to specifically disclose a method wherein the depth of the molten material at each pass lies in the range from 0.5 to 5 millimeters.

It would have been an obvious matter of design choice to a person of ordinary skill in the art to have the depth of the molten material in a range between 0.5 and 5 millimeters because discovering a workable depth range would have been a mere design consideration based on the desired cutting depth. Such a modification would have involved only routine skill in the art to accommodate the molten material depth requirement. It is noted that discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1995)).

Furthermore, Kuwahara in view of Hamasaki, Rizioiu, Sugita, and Fujita can laser cut concrete up to a thickness of 1.5 meters, therefore it can cut through any thickness

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less than 1.5 meters to produce a depth of molten material in the range of 0.5 and 5 millimeters.

Regarding claim 38, Kuwahara in view of Hamasaki, Rizioiu, Sugita, and Fujita discloses a laser power density of 800 Watt per centimeter squared which is within the range of 300 Watt per centimeter squared and 3000 Watt per centimeter squared (Fujita-col.5, lines 28-30).

Furthermore, it would have been an obvious matter of design choice to a person of ordinary skill in the art to have the laser power density be in a range between 300 Watt per centimeter squared to 3000 Watt per centimeter squared because discovering a workable power density range would have been a mere design consideration based on the desired amount of laser power that needs to be generated. Such a modification would have involved only routine skill in the art to accommodate the laser power density requirement. It is noted that discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1995).

Regarding claim 48, Kuwahara in view of Hamasaki, Rizioiu, Sugita, and Fujita discloses a device wherein the means for breaking resolidified material comprises a percussive member for crushing the material (Sugita-lines 31-33 on page 3).

Regarding claim 49, Kuwahara in view of Hamasaki, Rizioiu, Sugita, and Fujita discloses a device characterized in that the device consists of a hollow tubular like fragmentation agent capable of breaking up cement based material (Sugita-lines 31-33 on page 3 and figure 1-label 9). The crushed material is then sucked through the

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fragmentation agent by way of a suction pipe (Sugita-line 36 on page 7). This device serves as a simple way to extract the crushed material.

Regarding claim 52, independent claim 52 is a just a combination of independent claim 29 and dependent claims 38 and 43. As for the rejection of claim 52, refer to the rejections of claim 29, 38, and 43.

4. Claims 32, 46, and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuwahara in view of Hamasaki, Rizoiu, Sugita, Fujita, and Dyson (US 4380694).

Regarding claims 32 and 50, Kuwahara in view of Hamasaki, Rizoiu, Sugita, and Fujita fails to disclose a method and device wherein the laser beam is a parallel beam.

Dyson et al (hereinafter Dyson) discloses a method characterized in that the laser beam is a parallel beam (Dyson-col.2, lines 13-14). The Dyson method serves as an easy method of generating a parallel beam without the use of complicated laser optic devices.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate Dyson's method into the Kuwahara in view of Hamasaki, Rizoiu, Sugita, and Fujita method in order to generate a parallel laser beam since a parallel laser beam is easy to direct to the cement based material that is being cut thereby making the cutting process more efficient.

Regarding claim 46, Kuwahara in view of Hamasaki, Rizoiu, Sugita, Fujita, and Dyson discloses a method wherein the laser beam is delivered by a mobile beam

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delivery system comprising a system of more than one reflecting mirror (Dyson-col.2, lines 8-19).

5. Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kuwahara in view of Hamasaki, Rizoiu, Sugita, Fujita, and Chang (US 6864459 B2).

Kuwahara in view of Hamasaki, Rizoiu, Sugita, and Fujita fails to disclose a method and device wherein the laser beam has a circular or rectangular cross section.

Chang et al (hereinafter Chang) discloses a laser system capable of generating a laser beam with a rectangular, square or circular cross section (Chang-col.4, lines 31-34). Chang's ability to generate different types of cross sectional laser beams allows for better accuracy when cutting rectangular or circular materials.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the circular or rectangular cross sectional laser beam of Chang's device into the Kuwahara in view of Hamasaki, Rizoiu, Sugita, and Fujita method in order to increase the cutting accuracy.

6. Claim 37 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kuwahara in view of Hamasaki, Rizoiu, Sugita, Fujita, and the Cement and Concrete Faqs publication.

The Cement and Concrete Faqs publication was discussed in the previous office action.

Kuwahara in view of Hamasaki, Rizoiu, Sugita, and Fujita fails to disclose that the amount of pressure required for crushing solidified cement based material is less than 100MPa.

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It is well known to one of ordinary skill in the art that the pressure required to break conventional concrete is around 48 megapascals (7000 psi) which is a pressure less than 100MPa (Cement and Concrete Faqs, page4).

As a result, it would have been an obvious matter of design choice to one of ordinary skill in the art at the time the invention was made to incorporate a crushing pressure less than 100MPa into the Kuwahara in view of Hamasaki, Rizoiu, Sugita, and Fujita's method and it appears that the Kuwahara in view of Hamasaki, Rizoiu, and Sugita method can handle a crushing pressure of less than 100 megapascals.

7. Claim 39 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kuwahara in view of Hamasaki, Rizoiu, Sugita, Fujita, and Smolinski (US 5142778).

Kuwahara in view of Hamasaki, Rizoiu, Sugita, and Fujita fails to disclose a beam traverse speed that lies between 3 centimeters per minute and 30 centimeters per minute.

Smolinski discloses a laser beam device with a beam traverse speed of 10 inches per minute (Smolinski-col.3-table I).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the beam traverse speed of Smolinski's device into the Kuwahara in view of Hamasaki, Rizoiu, Sugita, and Fujita's method in order to have a predefined laser beam speed beforehand.

Furthermore, it would have been an obvious matter of design choice to a person of ordinary skill in the art to have a beam traverse speed in a range between 3 centimeters per minute and 30 centimeters per minute because discovering a workable

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traverse beam speed would have been a mere design consideration based on the desired speed of the laser beam output. Such a modification would have involved only routine skill in the art to accommodate the beam traverse speed requirement. It is noted that discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1995)).

8. Claim 43 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kuwahara in view of Hamasaki, Rizoiu, Sugita, Fujita, and Neev (US 6482199B1).

Kuwahara in view of Hamasaki, Rizoiu, Sugita, and Fujita fails to disclose a material removal rate that lies between a region of 150 per cm³.kWh for a diode laser and 100 per cm³.kWh for a CO₂ laser.

Neev discloses a material processing device involving the use of diode and carbon dioxide lasers with a rate of material removal ranging from 10⁻⁷ watt per cubic centimeter to 10⁻¹⁸ watt per cubic centimeter (Neev-col.7, lines 52-58; col.22, line 38; col.46, lines 44-51). Furthermore, depending on the amount of time required for a material process, such a rate of removal can be performed per second, per hour and etc.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the material removal rates of Neev's device into the Kuwahara in view of Hamasaki, Rizoiu, Sugita, and Fujita's method so that the material removal rate can vary.

Furthermore, it would have been an obvious matter of design choice to a person of ordinary skill in the art to have the rate of material removal in a region of 150 per

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cm³.kWh for a diode laser and 100 per cm³.kWh for a CO₂ laser because discovering a workable rate of material removal would have been a mere design consideration based on the type of laser source that is being used. Such a modification would have involved only routine skill in the art to accommodate the rate of material removal requirement. It is noted that discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1995)).

Response to Arguments

9. Applicant's arguments filed on 10/14/2009 have been fully considered but they are not persuasive. Applicant(s) argues that Kuwahara, Hamasaki, and Rizoiu fail to teach or suggest cutting cement by producing a depth of molten material having a depth of 10mm at each traverse. The examiner respectfully disagrees because the Kuwahara, Hamasaki, and Rizoiu teach and/or suggest a laser cutting method capable of detecting any amount of depth of molten material produced during each pass of the laser cutting process. Since the laser cutting method can detect any amount of depth of molten material produced, the laser cutting method thereby can produce a 10mm depth of molten material at each traverse i.e. cutting pass.

Furthermore, Kuwahara in view of Hamasaki and Rizoiu teaches and/or suggests laser cutting a cement based material up to 1.5 meters which would solve the 10mm molten material depth requirement.

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

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§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. See PTO 892.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MAYA CLARK whose telephone number is (571)270-5605. The examiner can normally be reached on Monday through Friday, 10 am to 6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, TU HOANG can be reached on (571)272-4780. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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/MAYA CLARK/
Examiner, Art Unit 3742

/M. Alexandra Elve/
Primary Examiner, Art Unit 3742

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